

## **The Market for Corporate Control and Corporate Cash Holdings**

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Comments welcome

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### **Abstract**

Conventional wisdom asserts that the market for corporate control monitors a firm's cash holdings. Using a sample of hostile takeover activity from 1985-1994 and quarterly data, I find that the probability a firm will be acquired is decreasing in cash holdings. Firms which were not targeted during the sample held 50% more cash, on average, than firms which were targets of hostile takeover attempts. This result holds even for firms which hold too much cash as well as those with poor investment opportunities. I document that cash decreases the probability of acquisition by deterring potential bids from occurring. Cash holdings may also provide firms with the time to find a white knight once they are targeted. In addition, a target's cash holdings do not increase the bid premiums offered. Finally, I show that cash holdings fall following the passage of state antitakeover legislation. These results imply that managers may hold cash to entrench themselves at the expense of shareholders. Consequently, I do not find that the market for corporate control monitors corporate cash holdings. I also provide some evidence showing that cash holdings decrease such monitoring.

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## 1. Introduction

“I look at a cash-rich company in America and wonder what’s wrong with its management. What’s wrong with its business? Who is going to take it over? What do the people at this cash cow think they are doing?”<sup>1</sup> The preceding quote by Peter Canelo, U.S. investment strategist at Morgan Stanley Dean Witter conveys the conventional wisdom in finance, that the market for corporate control can monitor corporate cash holdings by targeting firms which hold large amounts of cash.

There is much evidence indicating that management would rather keep resources within the firm than pay them out to shareholders, and management can keep resources within the firm in the form of liquid assets. If it is true that large cash holdings make firms susceptible to a takeover, then the threat of discipline from the market for corporate control would reduce management's willingness to accumulate large cash holdings.

Jensen (1986) discusses the costs of free cash flow and argues that firms with free cash flow that refuse to pay it out to shareholders are likely takeover targets. Hence, Jensen argues that the market for corporate control can monitor the cash holdings of firms. Yet, Opler, Pinkowitz, Stulz, and Williamson (1998) [OPSW] find that many firms seem to hold too much cash and do so for extended periods of time. This result is puzzling in light of the active market for corporate control in the United States. Perhaps large cash holdings provide firms with the flexibility and resources to defend themselves from unwanted takeover attempts. It may also be the case, perhaps paradoxically, that a firm with large cash holdings may be more difficult to value in the takeover market since the target can easily and quickly pay out its cash. In this paper, I investigate whether or not the market for corporate control has a monitoring effect on cash holdings.

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<sup>1</sup> International Herald Tribune, September 26-27, 1998, page 20.

Using a sample of hostile takeover attempts from 1985-1994, I examine the impact of cash holdings on acquisition probability. In logistic regressions, I find that cash holdings do not make firms more likely to be successfully acquired. In fact, cash rich firms appear significantly less likely to lose their independence via a hostile takeover. In addition, I find that the results are similar for firms holding too much cash using several measures of excess cash holdings similar to those used in OPSW (1998). I also examine firms with poor investment opportunities where the costs of holding too much cash are likely to be large. However, even in those firms, cash holdings do not increase the probability of being acquired. These results are inconsistent with the idea that the market for corporate control monitors a firm's cash holdings. Instead, it appears that cash holdings may actually decrease such monitoring.

Having documented that the takeover market does not monitor cash holdings, I investigate reasons for this relation. Specifically, I examine whether cash holdings reduce the probability of being a target, or whether cash allows targeted firms to retain their independence once a bid is launched., or both I find that cash holdings significantly reduce the probability of being targeted. In addition, there is evidence that cash holdings may provide the firm the opportunity to defeat a hostile bid by allowing the firm time to find a white knight The results using the excess cash measures are also similar.

Since higher levels of cash actually reduce the probability that the firm will be acquired, I examine whether or not this is in shareholders' interests. It may be that cash benefits shareholders by reducing the probability of acquisition, but increasing the premium paid if a bid occurs (see Stulz (1988) for this argument in relation to ownership). Shareholders may then receive higher returns, albeit less frequently. Thus, I examine the effect of cash holdings on bid premiums. I find that bid

premiums are not higher for firms with more cash. The results suggest that managers and not shareholders benefit from large cash holdings.

Overall, the results provide evidence that the market for corporate control is unable to effectively monitor the cash holdings of corporations. In fact, it seems to be the case, perhaps paradoxically, that an active takeover market may give managers the incentive to hold large amounts of cash in order to increase their probability of remaining independent.

I attempt to directly examine the idea that managers may hold cash in order to remain independent by examining what happens to cash when antitakeover defenses are enacted. A potential problem in examining these defenses is that they are likely to be enacted when takeover probability is high. Thus, the decision to adopt most takeover defenses is endogenous and makes any interpretation difficult and unclear. Hence, I examine cash holdings around the passage of antitakeover legislation. Since the enactment of the laws is primarily exogenous, it allows for clearer inferences. If managers use cash as a takeover deterrent, we might expect to see cash holdings decrease when the laws are enacted. Conversely, if cash holdings are the result of an agency problem and the market for corporate control is able to correct it, we should see an increase in cash after the laws are enacted since takeovers are more difficult. Using annual data, I find that firms hold significantly less cash after antitakeover laws are enacted. These results are robust to several specifications and lend strong support to the idea that not only is the takeover market unable to monitor the cash holdings of firms, but an active market for corporate control may promote higher cash holdings than we might otherwise observe.

This paper makes contributions to two separate strands of literature. First, I provide empirical evidence which shows that the market for corporate control does not monitor cash holdings because

firms which hold large amounts of cash are not more likely to be acquired. My results also add to the recent evidence on corporate cash holdings by showing that cash can promote the independence of management not only from the capital market, but from the market for corporate control as well.

The next section examines the implications of cash holdings for the market for corporate control. The data is described in Section 3 while the analysis and results are presented in Section 4. Section 5 concludes.

## **2. Cash and the Market for Corporate Control**

Examining whether the takeover market can monitor cash holdings may seem unimportant because other mechanisms might serve the same purpose. For instance, Jensen (1986) argues that debt serves such a function by bonding managers to make future interest payments. However, diffuse shareholders may not be able to force management to increase leverage. Zwiebel (1996) models capital structure and argues that managers may be willing to incur debt on their own in order to avoid being takeover targets. This seems as though it might solve the problem, because managers have the incentive to issue debt. Unfortunately, if larger cash holdings do not increase the probability of a takeover, it seems unclear why managers have the incentive to issue debt in his model. Another possibility is that creditors, for instance banks, can monitor cash holdings, but this does not seem to be the case either. For instance, Pinkowitz and Williamson (1998) show that in the bank centered system of Japan, cash holdings are significantly higher than they are in the United States. Their empirical work seems to confirm the assertions by Macey and Miller (1997) that banks may encourage conservatism in firms, resulting in too little risk taking. Since cash is a risk-free asset (at least nominally), banks may have no incentive to limit a firm's cash holdings. This is simply an

extension of the agency conflict between bondholders and stockholders first discussed in Jensen and Meckling (1976). Thus, because banks have no incentive to monitor a firm's cash holdings, it becomes more important to figure out whether the market for corporate control can. The following sections present competing hypotheses regarding whether takeovers can prevent managers from holding large, perhaps excessive, levels of cash.

## **2.1 Theoretical Predictions**

Jensen (1986) discusses the costs of free cash flow and argues that firms which refuse to pay free cash out to shareholders are likely takeover targets. One reason firms may be holding cash is that they do not have adequate positive NPV projects and do not want to return the cash to shareholders. Jensen (1986) argues that this was characteristic of the oil industry in the late 1970s and early 1980s and that the market for corporate control was able to monitor the cash holdings of these firms. If the investment opportunities of the firm are related to the quality of management, excess cash holdings can imply that management is of poor quality. Because the market for corporate control is seen as a competition among managerial teams for productive assets (see Jensen and Ruback (1983)), we might expect to observe higher quality managers bidding for cash rich firms.

Cash also allows managers the flexibility to make investments without being subjected to the monitoring of the capital markets. If managers have a desire to build empires or consume perquisites, cash allows them to pursue these activities. Also, if there are benefits to control, managers may have an incentive to decrease the riskiness of the firm's investment program to lessen the probability of bankruptcy. Holding cash allows managers to do this. Hence, large cash holdings may symbolize that management is not working in the best interests of shareholders. In such a case, corporate control

activity should be more likely.

The statement cited in the introduction does not seem to be unusual. It appears that investment bankers, industry publications, analysts, and even legal advisors share the belief that cash holdings make firms likely to be acquired. One reason for this belief is that potential bidders may be able to use the target's cash holdings to finance the takeover. In many takeovers (especially LBOs), assets are liquidated in order to repay bridge financing. Shleifer and Vishny (1993) argue that assets may not be easily sold at their full value. As such, more than \$1 of assets will need to be liquidated to raise \$1 of cash. However, this is not a problem with cash because a bidder can use it dollar for dollar. Thus, a large stockpile of cash may invite a takeover attempt since the deal may finance itself. This seems to be a fairly common belief among practitioners and the press. Ivan Obolensky, a vice president of a brokerage and investment banking concern stated, "[Paramount is] definitely a target for takeover. Paramount is cash rich and collecting more money; that's always good. Its 1990 earnings include interest income alone of \$78.8 million. That's what people love. Paramount will have to invest this cash quickly."<sup>2</sup> In addition, a Standard and Poors research report advised, "[Block Drug's] balance sheet showed cash, marketable securities, and long term investments totaling \$300.5 million . . . We believe this makes the company an attractive takeover target."<sup>3</sup> MIS Week, a high-tech industry publication reported, "It should come as no surprise that Wall Street analysts will continue hunting for acquisition candidates in the high-tech sector in 1989. They're all looking for companies with large cash holdings, undervalued assets or poor management."<sup>4</sup> Some analysts also

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<sup>2</sup> Publishers Weekly, January 25, 1991

<sup>3</sup> Standard & Poor's Emerging and Special Situation, April 18, 1994.

<sup>4</sup> MIS Week, January 16, 1989

seem to subscribe to this belief, “. . . analysts have said that Pacific Scientific’s strong balance sheet and ample working capital, including cash and marketable assets, make it a logical target for a leveraged buyout. One analyst last year called the company a ‘sitting duck’.”<sup>5</sup> Even legal advisors seem to subscribe to this belief. In an article entitled “Counsel can Help Thrifts Ward off Hostile Takeovers,” it is reported, “Certain factors may make a company particularly vulnerable to a takeover attempt. They include . . . a liquid financial condition, including large cash holdings . . .”<sup>6</sup>

How can a belief seem so pervasive if it’s not at least partially correct? A possible answer is that if people who defy the common wisdom are able to make money by more accurately predicting takeover targets, they have no incentive to inform others that the popular beliefs are incorrect. Also, it may be the case that the press pays more attention to the events which support the conventional wisdom. For instance, the highly publicized activity surrounding Chrysler and Kirk Kerkorian lends support to the idea that cash holdings increase the chances that a firm will be targeted. Nonetheless, it is unclear whether the Chrysler situation is the norm or an exception.

Other work implies that the liquidity of cash may be so unique that the market for control cannot monitor a firm’s cash holdings.<sup>7</sup> In fact, there are several reasons why large stockpiles of cash might make firms less likely to be targeted. One reason is that firms could use their liquid resources to defend themselves against the takeover attempt. For instance, firms with large cash holdings can more readily repurchase their own shares which leads to a lower probability of takeover success.

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<sup>5</sup> Los Angeles Times, April 21, 1987

<sup>6</sup> Legal Times, March 26, 1984

<sup>7</sup> See Myers and Rajan (1998) for a description of how liquidity may prevent firms from obtaining external finance.

Bagwell (1991) shows that if firms face an upward-sloping supply curve for shares, a takeover is more costly for a bidder if the target repurchases. Her argument is based on the idea that in a repurchase, the investors with the lowest valuations will tender first, thus any attempt by the bidder to acquire stock will have to be done at a higher average price. She shows that capital gains taxes can create such a situation. Additionally, her model assumes that there are no costs to the bidder of an unsuccessful takeover attempt. In reality, the costs of bidding can be substantial which could further induce bidders to pass up potential targets.<sup>8</sup> Stulz (1988) and Harris and Raviv (1988) both argue that takeovers can be defended through repurchases due to the change in proportional ownership they bring about. A repurchase from outside shareholders would increase the proportionate holdings of managers or shareholders aligned with management, thus making a successful acquisition more difficult. Although Harris and Raviv use debt to finance their repurchase, the argument may be strengthened if the repurchase is financed from internal cash since this is less costly for managers.

However, stock repurchases are not the sole mechanism through which a cash rich firm can defend itself. A firm with substantial resources can engage in outside acquisitions making itself a less appealing target. For instance, targets could acquire assets unrelated to the line of business, or conversely, assets directly related to the bidder so that a takeover could raise antitrust issues. Also, there may be reluctance to bid for firms with cash holdings since a cash rich target subjects the bidder to the possibility of the Pac Man defense, whereby the target attempts to acquire the prospective bidder. Finally, target management can pay out the cash to its shareholders at any time which may

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<sup>8</sup> Bagnoli, Gordon and Lipman (1989), Persons (1994), and Sinha (1991) also argue that stock repurchases can serve as a takeover defense.

eliminate the very reason for a takeover attempt. This point is formalized in Hendershott (1996) who models takeover contests motivated by free cash flow, which he defines to be an acquisition attempt where the bidder's potential gains come from eliminating target overinvestment. A key result of his model is that large cash flow agency problems of the targets are not associated with successful acquisitions. The intuition is that takeovers will not occur to rectify problems that can be resolved more easily and cheaply by the target than the bidder.

The fact that the firm can easily pay its cash out to shareholders further complicates the analysis for a prospective bidder. Although it seems that cash should be easily valued because it is completely liquid, it is not certain that a potential bidder will acquire the cash since the target can quickly and (relatively) costlessly repay it to shareholders. Consider a potential target with \$100 in cash and \$100 in fixed assets. Assume that the fixed assets are underutilized and worth \$150 to a prospective bidder. As such, the target firm is currently valued at \$200 but worth \$250 to the bidder. Consider a takeover bid for the firm at \$225. This seems to be optimal because the bidder and the target shareholders each gain \$25. However, due to the immediate liquidity of the cash holdings, the target could repay them to current shareholders. If this were to occur, there would be a \$225 bid outstanding for only \$150 in assets. At the same time, the bidder cannot launch a takeover attempt at \$150 since the firm is currently worth \$200. Hence, unless synergies are so great that the bidder appraises the fixed assets at \$200 or more, any bid they might make will be lower than the current value of the firm. This problem is unlikely to occur with other types of assets since they are more difficult and perhaps costly to liquidate (see for instance Shleifer and Vishny (1993)). Since we do not observe takeover attempts where the bid is conditioned on the target maintaining its level of cash, this must be considered by potential bidders and could prevent takeover attempts from occurring.

Another factor to consider is that it is costly to undertake a takeover. Since bidders incur large costs, they will launch an attempt only when they believe the bid has a high probability of succeeding. If the bidder realizes that the potential target has a large amount of cash which can be used to decrease this probability, bidders might pass up these opportunities in order to save the costs.

Thus, there is an unresolved empirical question in the finance literature. Does the market for corporate control monitor a firm's cash holdings? If the takeover market is unable to prevent managers from holding large amounts of cash, there may be no effective device (short of ex ante contracting) which serves as a check on corporate cash holdings.

## **2.2 Prior Empirical Work**

If the market for control can effectively monitor a firm's cash holdings, we should see cash rich firms being targeted more often than cash poor firms. Palepu (1986) and Song and Walkling (1993) examine the impact of liquidity on the probability of a firm being a takeover target and find the coefficient to be insignificantly negative. Ambrose and Megginson (1992) and Comment and Schwert (1995) also examine takeover attempts and both find that liquidity is not significantly related to takeover probability. Walkling (1985) finds that liquidity is not significantly related to successful tender offers. However, none of the studies examine liquidity using solely cash and cash equivalents, rather it is usually net working capital. Cash holdings may be substantially different from other current assets, even those considered highly liquid because there is no liquidation cost, either explicitly (Sheifer and Vishny (1993)) or in terms of time.

A more direct test of the impact of cash holdings on the likelihood of being targeted is performed in a contemporaneous paper by Harford (1998) who examines the effect of cash holdings

on firms which make acquisitions. He also briefly examines firms which are likely to be targeted and finds that firms with large holdings of cash are significantly less likely to be takeover targets. His results are the first direct evidence that large cash holdings may actually dissuade potential bidders. However, Harford does not examine whether large cash holdings make a firm less likely to be successfully acquired. Even if bids are less likely to occur, it may be the case that once a bid is made, a high cash firm is more likely to lose its independence. It is therefore possible that firms with more cash are less likely to be targeted but more likely to be acquired. In addition, his results do not directly examine whether firms which hold too much cash are more likely to be targeted. Hence, his results cannot say whether the market for corporate control can monitor cash holdings.

In the previous section, hypotheses were presented which argue that cash may make takeovers less likely because firms could use their cash to defend themselves. A remaining question is whether or not these defenses could be successfully implemented. Dann and DeAngelo (1988) examine defensive adjustments by targets of hostile bidders. Although they have only eight firms where stock repurchases were used, they find that in all cases, the bidder did not acquire control. They state, “[t]hese facts offer some hint that stock repurchase served as a relatively strong deterrent . . . in our sample contests.” They go on to argue that “. . . stock repurchases may be motivated in part by managers’ attempts to increase their vote ownership percentage and that the observed share value increases may reflect the market’s perception that managers undertake repurchases when they foresee a higher probability of takeover.” Not only do their results suggest that the ability to repurchase shares may serve as a takeover deterrent, but they mention this explicitly. “This fact suggests that the ex ante choice of a capital structure that preserves financial flexibility . . . can itself represent a takeover defense.” Clearly, no capital structure is more flexible than one with large holdings of cash.

Denis (1990) also examines defensive changes in response to takeover activity. He uses a sample of 49 firms which announced defensive payout plans in response to a takeover threat. The majority of his cases (33 of the 49) represent some kind of stock repurchase, either open market or self tender offer. He finds that only eight of the 33 (24%) firms are successfully acquired after announcing the stock repurchase. Denis also mentions that his sample has little overlap with that of Dann and DeAngelo (1988). In addition, Denis documents significantly negative abnormal returns around the announcement of a defensive share repurchase. The negative stock market reaction lends further support to the argument that repurchases can lower the probability of a successful acquisition. Thus, it appears that the defenses a target can implement with its cash holdings are effective in defeating takeover attempts. Hence, the takeover market may be unable to monitor cash holdings.

If cash holdings serve to deter hostile takeovers, we might expect managers to hold cash in order to entrench themselves. In fact, management may find that cash holdings have several advantages over more common antitakeover devices. A nice feature of using cash as a takeover deterrent is that it is flexible. Mitchell and Mulherin (1996) show that takeovers tend to be induced by industry shocks and thus the probability of takeover varies through time. Because a firm can vary the amount of cash it holds, it can increase its holdings in times when the probability of a takeover is large and decrease its cash as takeover probabilities fall. Another reason cash may be a better takeover defense than other devices is that the evidence in Comment and Schwert (1995) seems to indicate that poison pills are not effective takeover deterrents, while the results of this paper imply that cash holdings are effective. Also, cash holdings do not require consent from either the board of directors or shareholders. Furthermore, holding cash is a subtle way for management to reduce the probability of a takeover. It seems credible that managers could argue that holdings of cash are for

reasons other than to avoid a takeover. It seems hard to believe that a firm which initiates a poison pill could argue that it is for any purpose other than to make a takeover more difficult.

Finally, the Chrysler saga offers another insight into cash holdings and takeover activity. Although a bid for the company did occur, management did not appear to be harshly disciplined. In exchange for a standstill agreement from Kerkorian, Chrysler agreed to pay out some of its excess cash to shareholders. Nonetheless, incumbent management still retained their jobs as well as control over a substantial amount of cash. Thus, it may be the case that for firms with large amounts of cash, even if targeted, the outcome may not be detrimental to managers.

### **2.3 Summary**

The prior research on cash holdings and the market for corporate control leaves us with an important empirical question. Can the takeover market monitor the cash holdings of firms as conventional wisdom believes, or might cash actually serve to deter takeovers? If takeovers cannot prevent firms from holding high levels of cash, there may be no monitoring mechanism that can accomplish this. Additionally, if cash does serve as a takeover deterrent, then an active market for corporate control may actually increase corporate cash holdings rather than limit them. The remainder of this paper examines this question.

### **3. Data**

For the accounting variables in this study, both the quarterly and annual Compustat tapes are used. For the quarterly tapes, some data items are not listed every quarter, but rather biannually or annually. For these cases, I divide these numbers equally across the spanned quarters. The quarterly

data set is from 1985-1994 and covers 40 quarters. I use calendar quarters rather than fiscal quarters and exclude financial firms and utilities from all of the analysis. The annual data set is identical to the one used in OPSW (1998) and covers 1971-1994.

### **3.1. Cash**

In this paper, I measure cash as cash and marketable securities deflated by total assets. However, since the focus of the paper is cash, I also include other measures of cash holdings. Examining cash without controlling for its determinants may simply measure an industry effect, hence, I include several measures of excess cash which are calculated similarly to OPSW (1998). Excess cash is defined as the residual from a regression that predicts cash to assets (see the Appendix for details). The excess cash measures also allow me to examine whether firms which hold too much cash are more likely to be takeover targets. Additionally, because I am trying to show that cash may be different from other liquid assets, I examine net working capital without cash (current assets - current liabilities - cash plus marketable securities). Finally, I examine the cash flow of a firm using earnings after interest, taxes, and dividends, but before depreciation and amortization divided by total assets  $((EBITDA - taxes - interest - dividends) / total\ assets)$ . The cash flow variable allows me to examine whether the flow of liquidity is different from the stock. It also provides a measure of the amount of liquid assets that a firm's productive assets can generate.

### **3.2. Other Control Variables**

In order to accurately examine the impact of cash holdings on takeover probability, I need to control for other firm characteristics which have been shown to affect the probability of being

targeted. In prior studies (see for instance, Palepu (1986), Ambrose and Megginson (1992), Song and Walkling (1993), Comment and Schwert (1995), and Harford (1998)), although different proxies are occasionally used, many of the same control variables appear. These include measures of a firm's size and leverage, its prior performance, and its growth opportunities.

To control for a firm's size, I use the value of stockholders' equity deflated into 1994 dollars using the CPI. A firm's leverage is defined to be  $(\text{long term debt} + \text{short term debt}) / \text{stockholder's equity}$ . I control both for a firm's prior stock returns and accounting performance using return on equity, sales growth, and past returns. Return on equity (ROE) is defined to be net income divided by stockholder equity. Sales growth is defined from year to year, thus for quarterly data it is calculated as  $(\text{sales}_t - \text{sales}_{t-4}) / (\text{sales}_{t-4})$ . Past stock performance is measured as the compounded 12 month raw stock return calculated using CRSP monthly stock returns. To control for the quality of a firm's investment opportunities, I use the market to book ratio (see for instance Smith and Watts (1992)) which is used in most of the prior work examining takeover probability. I define the ratio to be  $(\text{book value of assets} - \text{book value of equity} + \text{market value of equity}) / \text{book value of assets}$ . However, since the empirical distribution of this ratio is heavily skewed and fat tailed, I invert the ratio and use book to market in my statistical analysis.<sup>9</sup> In order to mitigate the effects of any outliers, all data items are winsorized at the one percent levels.

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<sup>9</sup> The empirical distribution of the market to book ratio has a skewness of 3.5 and a kurtosis of 17.6 while the book to market ratio has a skewness of 0.34 and a kurtosis of approximately 3. My main results do not depend on whether I use book to market or market to book.

### **3.3. Takeover Sample**

Takeover data is obtained from Comment and Schwert (1998). Comment and Schwert examine acquisition attempts of exchange-listed firms from 1975-1994. However, because my quarterly data starts in 1985, I use the sub-sample of 1,070 acquisition attempts from 1985-1994. Since hostile takeovers are associated with the monitoring role of the market for corporate control, I limit my analysis to the 205 hostile takeover attempts. A takeover attempt is defined as hostile if Securities Data Corporation (SDC) defines it as such. Limiting the analysis to hostile takeover attempts has the added benefit of eliminating from the sample firms which put themselves up for sale. Consider a firm which is not performing well and finds itself near financial distress. It is possible that such a firm might put itself in play and actively seek a buyer. Those firms are likely to be financially constrained and cash poor, hence we may find a negative relationship between cash holdings and the probability of being acquired. Thus, removing those firms from the takeover sample should allow for a more powerful test of whether the market for corporate control can monitor a firm's cash holdings.

Although the data in Comment and Schwert (1998) is matched with the annual COMPUSTAT data, when I combine it with the quarterly tapes, I find that 147 of the 205 hostile takeover attempts have data regarding cash holdings. Due to additional data availability, the number of takeover attempts used in logistic regressions varies from about 107 to 136. Of the 147 hostile takeover attempts, 95 are successful. A takeover attempt is defined as successful if the target is subsequently acquired even if not by the original bidder. When I define success relative to the hostile bidder, I find that 51 of the 147 attempts are successful. Additional data requirements reduce the number of successful takeovers used in logistic regressions from 72 to 91 (38 to 47 when success is defined relative to the hostile bidder).

From Comment and Schwert (1998), I also have measures of the deal characteristics such as whether the bid was for cash or stock, whether the target had a poison pill in place, and whether there was more than one bidder. In addition, I examine the SDC Mergers and Acquisitions database to find more deal specific information on the sample of takeover attempts.

### **3.4. Control sample**

Rather than attempt to match takeover firms with control firms based on a few key characteristics, I use the full universe of COMPUSTAT firms. Since the takeover sample is limited to exchange-listed firms, I limit the control sample to firms which were listed on the NYSE or AMEX during the 1985-1994 period.<sup>10</sup> Thus in each quarter, all exchange-listed firms which were not targets of a takeover attempt serve as the control sample. Since the full time series is used, the firms which were targeted serve as part of the control sample in the quarters prior to being targeted.

## **4. Analysis**

### **4.1. Univariate Results**

If management keeps large levels of cash to invest in poor projects instead of paying higher dividends, then monitoring should alleviate this problem. As discussed in Section 2, Jensen (1986), among others, argues that the market for corporate control performs this role by targeting firms which have large levels of free cash and are unwilling to return it to shareholders.

To provide a descriptive analysis between those firms that were targeted during the 1985 to

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<sup>10</sup> The results are unchanged if I include all COMPUSTAT firms in the control sample. In addition, I also add hostile takeover attempts for Nasdaq firms and use the full universe of firms as the control, again the results are similar.

1994 period and those that were not, I perform a univariate analysis between these two groups. Table I presents summary statistics for all variables discussed in Section 3 for the takeover and control samples. The last two columns of Table I presents t-statistics (z-statistics) and p-values for tests of differences in the means (medians) between the two groups.

As Panel A reports, the firms are different with respect to their cash holdings. Firms which are never targeted during the sample period hold roughly 50% more cash to assets, both at the mean and the median. This difference is highly significant using both a t-test and a wilcoxon test. The same holds true for the three measures of excess cash. Similar results are also observed when examining net working capital. However, the results are less clear when looking at cash flow. Firms which were hostile targets seem to have significantly higher cash flow than non-targets at the mean, but the results using the medians are not supportive. Although the comparisons are only univariate, it appears that there may be a difference between cash levels and other measures of liquidity.

When I examine the control variables, I find that the takeover firms were larger than non-targets, at least with respect to medians. This runs counter to previous findings and may simply represent the fact that larger firms are more likely to be targets of hostile takeovers. This seems to be the case since when I examine all takeover attempts, I find that targeted firms are significantly smaller at both the mean and median level.

Targeted firms appear to have better performance since they have higher ROE and prior stock returns. However, the ROE results go the other way when examining medians which indicates that the distribution is skewed to the left. Targeted firms do not appear to have strong growth opportunities since they have significantly lower rates of sales growth and higher book to market ratios. Finally, firms which were targeted have higher leverage at the median than those which were

not targeted.

It appears that firms which are targeted differ from firms which do not receive bids along several dimensions. Although the results in Table I are only univariate statistics, they provide a glimpse into whether the market for corporate control can monitor a firm's cash holdings. I find that firms which were targets of hostile takeover attempts tended to have lower levels of (excess) cash than firms which were never targets of a takeover attempt. This result runs counter to conventional wisdom, hence further examination is needed.<sup>11</sup>

#### **4.2. Logistic Analysis: Determinants of Acquisitions**

In this section, I examine whether the market for corporate control can monitor cash holdings by analyzing whether cash rich firms are more likely to be acquired using logistic regressions. However, because many of the control variables are measuring similar firm characteristics, there is a concern of the results being driven by correlations among the variables. Thus, I present a correlation matrix in Table II. As Table II reports, the correlations among most of the variables are not very high. For instance, cash holdings are negatively correlated with both cash flow and working capital, although the coefficients are only around -0.18. Since the correlations are not large, in addition to including subsets of the variables, I include them all simultaneously in logistic regressions which examine the probability of a firm being acquired.

*Probability of Acquisition = f(ROE, Sales growth, NWC, Leverage, Book to market, Size, Cash flow, Prior stock returns, Cash)*

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<sup>11</sup> Since I truncate the hostile target sample at the quarter of being targeted, it may be the case that the cash results are driven by a general increasing trend in cash holdings over the 1985-1994 period. When I examine this, I find that (excess) cash holdings tend to be decreasing over time and thus a secular trend is not driving the results.

I also control for general macroeconomic trends and seasonality using calendar year dummies as well as quarter dummy variables. I do not report the time dummy variables in the tables.

Panel A of Table III reports the results of the estimation of the above logistic regression. The dependent variable is defined to be one if there is a hostile takeover attempt which proves to be successful in a given quarter and zero otherwise. I include two different measures of success in my analysis. For Panels A and B, I define a hostile takeover attempt to be successful if the firm is acquired by any bidder, even if it is not the hostile bidder. This is the definition of success that Comment and Schwert (1998) employ. In addition, I examine hostile acquisitions where success means that the hostile bidder gains control. These results are shown in Panels C and D of Table III. All independent variables are measured at the end of the quarter prior to the bid so I am not using any future information, and the characteristics of the target are potentially known to the bidder. I eliminate from the logistic analysis firm quarters with negative book values of equity since that creates negative leverage, which is difficult to interpret.<sup>12</sup>

The first column shows that larger firms which have lower book to market are significantly less likely to be acquired. This is consistent with Hasbrouck (1985) as well as Jensen and Ruback (1983) who argue that the market for corporate control is simply managers competing for control rights. If firms have high book to market ratios due to bad management, then they are more likely to be acquired. It also confirms the belief that larger firms are less likely to be acquired because they require substantial resources to be husbanded by the bidder.

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<sup>12</sup> Eliminating these firm quarters also removes negative ROEs which are driven by the denominator, rather than being driven by negative earnings. My main results are no different if I do not eliminate these firm quarters which represent about 1% of the total. My results are also robust to defining leverage as (long term + short term debt) / total assets.

I find that firms with more cash are significantly less likely to be acquired. The coefficient on cash to assets has a z-statistic of around -2.3 and implies that an increase in cash from the 1<sup>st</sup> quartile to the 3<sup>rd</sup> quartile decreases the probability of acquisition by almost 18%. Recall that if the market for corporate control monitored cash holdings, we would expect to see a significantly positive coefficient. Thus, this is strong evidence that the takeover market does not monitor cash holdings.

However, examining cash without controlling for its determinants may simply mean that my results are driven by an industry effect. Thus, I examine different measures of excess cash in regressions (2)-(4). In addition, since Jensen's (1986) free cash flow theory would apply only to firms with "too much" cash, I separate the excess cash measures into positive and negative components. The positive (negative) excess cash variable equals excess cash if the residual is positive (negative) and equals zero otherwise. Thus, positive excess cash serves as a quantitative measure of "free cash". If there is monitoring by the takeover market, we should find a significantly positive coefficient on positive excess cash. The theory has little to say about the expected sign for negative excess cash. In all three measures, I find that the coefficient on positive excess cash is not significantly positive, instead they are significantly negative. Thus, the hypothesis that the takeover market can monitor firms with "free cash" appears to be soundly rejected.

Although my results show that cash holdings significantly decrease the probability of being acquired, some may feel that examining cash without including other measures of liquidity is not sufficient. Since the correlations among them are not high, I rerun all four specifications including net working capital (without cash) and cash flow. Regressions (5)-(8) should isolate the impact of cash on acquisition probability and serve as a conservative test of whether the market for corporate control can monitor cash holdings. The results show that both total cash and positive excess cash are

still negative and significant. Thus, firms with “free cash” are less likely to be acquired. This result is diametrically opposed to conventional wisdom and indicates that the takeover market cannot effectively monitor a firm’s cash holdings. The implication seems to be that managers could hold large levels of cash with relative impunity. In fact, rational managers may hold more cash than they would in the absence of an active market for corporate control because a stockpile of cash appears to decrease the probability of a hostile acquisition.

Cash holdings provide managers with flexibility. However, such flexibility is a double-edged sword. Cash allows managers to undertake positive NPV projects that they may not be able to finance externally due to informational asymmetries or other market imperfections. At the same time, large cash holdings also allow managers to undertake projects which may be detrimental to shareholders. In firms with poor investment opportunities, one would expect the negative aspect of cash to be more important since agency costs of managerial discretion are high in such firms. Therefore, we would expect that at the very least, the takeover market would discipline excessive cash holdings by managers in firms with poor investment opportunities. Panel B of Table III examines this by including an interaction variable between (positive excess) cash and investment opportunities.

Every quarter, I segment firms by book to market ratio. High BM is a dummy variable which equals one if a firm is in the highest quartile of book to market for that quarter. Thus, firms are allowed to be reclassified each quarter as their investment prospects change. High book to market firms are likely those with poor investment prospects, or firms facing financial distress. Either way, if those firms are holding excessive levels of cash and the market for corporate control can effectively monitor cash holdings, we should see those firms being acquired more frequently. Hence, in the

logistic regression, an interaction term between high book to market and (positive excess) cash should be significantly positive. Instead, I find that the interaction terms are always negative and at times significantly so. Thus, even for the firms where the (positive excess) cash is likely to cause high costs from managerial discretion, the market for corporate control does not serve a monitoring function.<sup>13</sup>

Since managers are more likely to lose their jobs after a hostile bidder gains control (see for instance Walkling and Long (1984)), I re-examine my results defining successful acquisitions as those where the hostile bidder gains control of the firm rather than any bidder. The results are shown in Panels C and D of Table III. Using only the firms which lost their independence to the hostile bidders should provide a strong test of the monitoring capability of the market for corporate control. Even with this robust test, (positive excess) cash holdings still make firms significantly less likely to be acquired. In fact, a firm increasing its cash holdings from the 1<sup>st</sup> to the 3<sup>rd</sup> quartile is roughly 45% less likely to be successfully acquired by a hostile bidder. Panel D shows the results which include an interactive dummy variable for poor investment opportunities. The results are no different from the earlier results. The negative coefficients on positive excess cash in Table III indicate that firms with free cash are not disciplined by the market for corporate control.

The results of Table III offer some interesting implications. Take for instance, the positive coefficient on cash flow and the negative coefficient on (positive excess) cash. If firms are cash cows, i.e. they generate large cash flows yet have few growth opportunities, it seems that they are prime targets for takeover. At first glance this seems as though the corporate control market can solve the

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<sup>13</sup> Since book to market ratios vary by industry, it is possible that I am measuring industries with poor investment opportunities rather than individual firms. Thus, I repeat the analysis using an industry adjusted book to market ratio calculated by subtracting the median book to market ratio for the industry. Industries are defined by 2 digit SIC codes. The results are unchanged.

free cash flow problem. In fact, this reasoning may be the impetus for the conventional wisdom. However, there is a complication. If managers of a cash cow retain the cash without spending it, then they are less likely to be targeted. Perhaps surprisingly, the results imply that a takeover threat may prevent firms from returning cash to shareholders in the form of dividends. This seems to be in direct contrast to Jensen's (1986) free cash flow theory. Jensen argues that firms are likely to waste their free cash because keeping it would make them more likely to be disciplined by the takeover market. However, the results in Table III indicate that firms may retain their free cash for the very reason that it makes them less likely to be acquired. Thus, an active market for corporate control may, perversely, cause firms to hold more cash than they otherwise would.

A possible alternative explanation to my results is that firms choose to hold large amounts of cash when they feel that they are unlikely to be acquired. Thus, endogeneity may be driving the results. Although the excess cash measures should help to mitigate any endogeneity problem by controlling for the determinants of cash balances, I also attempt to address this problem in another way. If the results are merely an artifact of endogeneity, then we might expect to see similar results when I examine acquisitions that are not deemed to be hostile. I perform similar tests using successful acquisitions that are not listed as hostile by SDC and find that although the coefficients on (positive excess) cash holdings are negative, they are never significant. Hence, it seems as though the results are not simply an artifact of endogeneity.

In addition, I examine many alternatives to assess the robustness of my results. First, I use different specifications for the logistic regressions. For instance, I rerun the results including lagged terms for ROE and sales growth in order to better control for firm performance. In another check, I include research and development expenses to control for firm specific assets since bidders may not

value those assets as highly as targets. In addition, it is more costly to liquidate firm specific assets, thus those firms may be less likely to be targeted. Finally, other specifications are examined including the one used by Palepu (1986) and one similar to Harford (1998). The results of all the alternative specifications are qualitatively similar.

Since total cash holdings may be driven by industry, and Mitchell and Mulherin (1996) find that takeovers seem to be caused by industry shocks, it may be important to control for industry effects. Although the excess cash specifications should mitigate these problems, for robustness, I proceed along three additional fronts. First, I rerun all my results using standard errors calculated by assuming that there is independence across industries, but correlation within industries (defined by two digit SIC code). By relaxing the assumption of independence within industries, this allows me to account for industry shocks. Second, I rerun the regressions including dummy variables for each two digit SIC code. Finally, I use another measure of excess cash holdings which is defined as the deviation of cash to assets from the industry average. In all three cases, both total cash and excess cash remain significantly negative.

Prior research (see Comment and Schwert (1995), Palepu (1986), Harford (1998)) uses a four year average for the independent variables. Thus, I examine the results when I use the average of the previous four quarters. This also serves to reduce some of the noise that may be present in the quarterly data. I also re-examine the results using annual data computed from the trailing four quarters. Both sets of results are similar.

Finally, there may be concern that since the excess cash measures are residuals from a first pass regression which includes variables such as cash flow and market to book, combining the same variables with excess cash in the logistic regressions can lead to simultaneity problems. Although this

should be tempered by the fact that the residuals are orthogonal to those variables, I run a different specification where I use the lagged values of excess cash as an instrumental variable for excess cash. The results are similar to those reported. Thus, despite a more noisy measure, I still find that the market for corporate control does not monitor firms which hold too much cash.

Overall, it appears that not only do cash holdings not attract bidders, but they may act as a takeover deterrent. This is not limited to “normal” levels of cash; rather, I find that even firms which hold more cash than predicted are less likely to be targeted. Additionally, even in firms with poor investment prospects, large cash holdings do not make the firm more likely to be targeted. This is in direct contrast to the conventional wisdom and is inconsistent with the idea that the market for corporate control can effectively monitor corporate cash holdings. In addition, combined with the findings that cash flow is positively related to takeover, my results seem to imply that the market for corporate control may, paradoxically, encourage firms to hold higher levels of cash.

### **4.3 Why are Cash Rich Firms Less Likely to be Acquired?**

The empirical evidence indicates that cash holdings make firms less likely to be acquired. However, some may argue that an acquisition need not be successful to perform a monitoring role. The threat of being targeted may provide enough incentive for firms to limit their level of cash. Hence, I re-examine the results of the previous section using all hostile takeover attempts rather than those that were successful. In addition to addressing the concern that the threat of takeover is enough to monitor firms, examining the impact of cash on the probability of being targeted allows for further examination of the prior results. The earlier results are consistent with two different roles for cash: it either lowers the probability that a firm is initially targeted, or cash rich firms are just as likely

to be targeted, but can use their resources to defend themselves, or both. This section attempts to determine which effect drives the results.

If the threat of takeover is enough to monitor a firm's cash holdings, then we should find that cash rich firms are more likely to be targeted. To check this, I examine logistic regressions similar to the ones in Table III, except that the dependent variable is all hostile attempts, rather than only successful acquisitions. Panel A of Table IV shows these results.

The first column shows that the probability of being the target of a hostile takeover is significantly lower for cash rich firms. The marginal effects are of a similar magnitude as in Table III; hence, a firm moving from the 1<sup>st</sup> quartile to the 3<sup>rd</sup> quartile in cash holdings decreases the probability of being targeted by about 18%. More importantly, the coefficients on positive excess cash are significantly negative indicating that firms with free cash are less likely to be targeted. Again, these results are inconsistent with a takeover market which is monitoring corporate cash holdings.

To be certain that I am controlling for all other aspects of liquidity, I examine the regressions with cash flow and net working capital. As shown in regressions (5)-(8), this has no effect on the inferences regarding (positive excess) cash holdings. The results indicate that the takeover market is unable to monitor free cash, and in fact, firms can decrease their chances of being targeted if they increase their cash holdings.

For completeness, I examine whether the market for corporate control is more likely to target cash rich firms with poor investment opportunities by using an interaction variable between high book to market and (excess) cash. Panel B of Table IV shows that even for firms with poor investment opportunities, (positive excess) cash holdings do not increase the probability of being targeted.

It seems that not only does the takeover market not monitor cash holdings, but cash holdings

decrease the probability of being targeted in the first place. However, cash may also help firms which are targeted to defend themselves. In order to examine this, I use the sample of hostile takeover attempts and examine which factors lead to the eventual success or failure of the bid. I find that in my sample, roughly 65% (95 of 147) of the hostile takeovers are successful when success is defined without regard to the identity of the winning bidder. This is less than the 78% completion rate that Comment and Schwert (1998) find for the full sample, but it may be expected that hostile takeovers are less likely to be completed than friendly ones. If success is defined relative to the hostile bidder, merely 35% (51 of 147) of the hostile bids are successful.

To examine the impact of cash holdings on the probability a bid is successful, I look only at the firms that were targeted. Additionally, I use just the quarter that the firms were targeted and examine which characteristics contribute to the eventual success of the attempt. The results are shown in Table V. Panel A defines a bid to be successful without regard to the winner, while Panel B defines a bid to be successful if the hostile bidder acquires control.

Walkling (1985) examines the factors that contribute to the success of tender offers. He documents that target management opposition, the percentage of shares owned by the bidder (toehold) and the bid premium are important determinants of tender offer success. Although my sample is not limited to tender offers, I include variables which control for these factors as well as other characteristics of the bid. Management opposition is inherently controlled for since I examine only hostile takeover attempts. However, I also include a measure of a firm's antitakeover defenses. I define a dummy variable which equals one if the target had a poison pill in place since such a defense may reduce the probability of success. Walkling (1985) finds that toeholds and bid premiums are

important, hence, I also include these variables.<sup>14</sup> Bid premiums are measured comparing the hostile bid to the target stock price 20 trading days prior to the announcement of a bid (approximately one month). Lastly, I include several dummy variables which measure the characteristics of the bid. Cash Offer equals one if the bid is made for all cash, while Tender Offer equals one if the bid is launched via a tender offer. Finally, if there are multiple bidders, I set the variable Auction to one and zero otherwise. Although I do not report them, all regressions are examined using annual and quarterly dummy variables to account for macroeconomic factors and seasonality.

The results in Panel A which measure success without regard to the winner show that tender offers are significantly more likely to result in a completed bid. I do not find evidence that cash holdings by the target make the deal less likely to succeed. Although the coefficients on (positive excess) cash are negative, they are insignificant. The negative and significant coefficient on premium seems odd since it implies that the higher the bid, the less likely is its success. However, in Panel A, the bid premium is measured relative to the hostile bid while success is measured with respect to all bidders.

Since Panel A measures takeover success without regard to the eventual acquirer there may be a bias introduced into the cash coefficients. For instance, if a firm successfully finds a white knight to acquire them, I count that to be a successful acquisition. Thus, if a targeted firm can use its cash to buy itself time and seek out a white knight, the coefficients on (excess) cash would be biased away from finding deterrence. Hence, in Panel B, I examine the impact of (excess) cash on bid success measured with respect to the hostile bidder.

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<sup>14</sup> When toeholds are unavailable, I assume them to be equal to zero. Although this doesn't change any inferences, it allows me to use a more complete sample since actual toeholds are only available for approximately half of the targets.

In Panel B, we see that hostile bidders are far less likely to acquire control if there are multiple bidders. These are likely to be the cases where the target finds a white knight. Consistent with Walkling (1985), the probability of the hostile bidder acquiring control is significantly increasing in the premium offered. Finally, the coefficients on (positive excess) cash are all negative and significantly so half the time. Thus, it appears that firms may be able to use their free cash to prevent hostile bidders from acquiring control. The results are strengthened by the fact that there is likely to be a sample selection problem biasing the coefficients toward zero. Since we would only observe hostile bids where the probability of success was high, we would not observe bids that were likely to fail. Hence, the coefficients on variables known to the bidder should be biased toward zero. Because bidders are aware of the target's (excess) cash holdings prior to making a bid, those coefficients are likely to be biased toward zero. Thus, there does appear to be some evidence that a target can use its (excess) cash to prevent a hostile bidder from acquiring control. Since the coefficients on (positive excess) cash are less negative in Panel A it seems that cash holdings may allow a target to defeat a hostile bid by providing the firm time to find a white knight.

The results in Table V also reject the idea that the bidder can use a target's cash to finance the acquisition. If that were true, we should observe targets with large amounts of (positive excess) cash being successfully acquired more often, hence we should see significantly positive coefficients. The negative coefficients on cash seem to reject this possibility.

In sum, cash holdings appear to decrease the probability of acquisition by reducing the chances of being targeted. In addition, once a firm is targeted, cash holdings may be able to prevent the hostile bid from succeeding by allowing the firm time to find a white knight.

#### **4.4 Cash Holdings and Bid Premiums**

I have shown that (positive excess) cash holdings appear to decrease the probability of acquisition. Hence, cash may in fact be a takeover deterrent. If this is the case, it may help management or could be in the interests of shareholders. If cash holdings encourage higher bid premiums than would otherwise be observed, shareholders may be better off. This is exactly the argument made by Stulz (1988) applied to cash holdings rather than ownership. Thus, if cash holdings benefit shareholders, we should observe higher bid premiums for cash rich targets. This would imply that shareholders earn higher returns, albeit with lower probability.

Walkling and Edmister (1985) examine determinants of bid premiums in tender offers and I use a modified specification of their model. Table VI shows the regression results where the dependent variable is the takeover premium measured relative to the target stock price 20 trading days before the announcement. As we have seen, cash holdings may allow firms the time to find a white knight. Thus, examining only the bid premium offered by the hostile bidder may not be representative of the gains that target shareholders can attain. To control for this possibility, I examine two different measures of bid premium in Table VI. First, I calculate the premium measured relative to the hostile bid and then I calculate it relative to the highest bid that the firm received in the corporate control contest. Bid prices are collected from the SDC Merger and Acquisition database. Again, I include, but do not report, quarterly and yearly dummies to control for macroeconomic events and seasonality.

The regressions show that bid premiums are not significantly increasing in cash. In fact, the coefficients are negative and significant. I find the same results when I use the excess cash measures, except that the coefficients are not significantly negative. The results are similar when I calculate bid

premium using the highest bid received by the target. Hence, it does not appear that target cash holdings increase the premium offered by a bidder. If anything, bid premiums are lower for cash rich firms. Thus, it does not seem that shareholders benefit from the cash holdings. It appears that the benefits of (excess) cash holdings accrue only to managers in the form of greater entrenchment.

#### **4.5. Evidence From Anti-Takeover Laws**

Although the market for corporate control is thought to monitor cash holdings, I have shown that this does not seem to be the case. Moreover, there is evidence that an active takeover market may encourage managers to hold higher levels of cash than they might hold when takeovers are less likely. In addition, corporate cash holdings seem to entrench managers to the detriment of shareholders. If managers are holding cash to increase their likelihood of independence, it is possible that we might see lower cash holdings when the probability of takeover is reduced. This is in direct contrast to what free cash flow theory would predict. With that theory, we would expect managers to be willing to hold more cash when they become more entrenched.

One way to examine this is to look at cash holdings surrounding the implementation of an antitakeover device. However, since most devices are implemented when the probability of takeover is high, there is an endogeneity problem. An exception is the passage of antitakeover legislation which is primarily exogenous. Using the sample of business control laws described in Bertrand and Mullainathan (1998) allows for an examination of how the addition of a takeover defense impacts cash holdings.<sup>15</sup>

If the laws reduced the threat from the market for corporate control, the test is clear. Free

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<sup>15</sup> See Bertrand and Mullainathan (1998) for a description of the antitakeover laws.

cash flow theory would argue that cash holdings should increase after the laws are enacted. On the other hand, cash may decrease if the takeover market is not an effective monitor with respect to highly liquid assets. Comment and Schwert (1995) raise the question of whether or not business combination laws actually decreased takeover probability and document that there appears to be little evidence of deterrence. However, Bertrand and Mullainathan (1998) review work which shows that business control laws not only lessened takeover activity, but were also detrimental to shareholder wealth. Regardless, even if the laws ended up being ineffective, if cash holdings are controlled by management, then what matters is the perceived probability of takeover. Thus, as long as managers believed that the laws would deter takeovers the test should remain valid.

I use the differences-in-differences methodology that Bertrand and Mullainathan (1998) discuss (see their paper for a good description of the method). Essentially the methodology requires running a fixed effects regression determining cash holdings. The specification includes firm specific dummies, annual dummies, firm characteristics, and a dummy variable which represents the passage of the business control law. The results are documented in Table VII. The variable Law in the table equals one if the firm is incorporated in a state with a takeover law and the time is during or after the year the law goes into effect. Hence, it is a dummy variable measuring whether or not a firm is covered by a business combination law. Since the regression includes firm specific fixed effects as well as annual dummies, the coefficient on the variable Law represents the impact of the law on cash holdings for firms in the state where the law was implemented. Thus a positive coefficient on law would indicate that controlling for other variables, firms held more cash when they fell under the protection of the takeover law. This is what we should see if cash holdings are the result of an agency problem. On the other hand, if firms are holding cash as a takeover deterrent, we would expect to

see a negative coefficient. The remaining variables in the specification are identical to those used to calculate excess cash (see Table VII and Table A1 for a description of the variables) except that the data is on an annual basis, not quarterly.<sup>16</sup>

We see that the coefficient on law in the first regression is significantly negative which indicates that firms held less cash after they fell under the protection of antitakeover laws. Since leverage and cash holdings may be simultaneously determined, I also include a specification which examines cash holdings without leverage, capital expenditures, and the dividend dummy. This can be interpreted as a reduced form equation. The coefficient on law is still significantly negative. The results seem to reject free cash flow theory. Instead, it indicates that not only does an active market for corporate control fail to monitor corporate cash holdings, but it causes firms to hold more cash than they might otherwise.

For robustness, I also rerun both specifications using time and industry dummy variables as well as a regression using only time dummies. Although they allow further examination, without the firm dummies, these specifications don't allow us to fully examine firm cash holdings and takeover laws. Nonetheless, the results remain supportive of the idea that firms held substantially less cash after the laws went into effect than before.

Since the year by year firm data is likely not independent, the t-statistics may be inflated from the use of a pooled time-series cross-sectional regression. Thus, a Fama-Macbeth (1973) regression may be in order. Unfortunately, this methodology provides no help since we require the time-series in order to examine the impact of the law. Hence, I attempt to perform an analogous study by

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<sup>16</sup> The data comes from OPSW (1998) and thus industry sigma is measured as the volatility of cash flow to net assets where net assets are (assets - cash). All other variables are deflated by total assets.

running the specifications by state of incorporation and then using the series of coefficients to draw inferences. The results are included in the state-average category. Again we see that for both specifications, the coefficient on law is significantly negative. This is strengthened by the fact that in states where no law was passed, the coefficient on law is zero. In fact 24 (21) of the 55 coefficients are zero while only 4 (7) are positive in the first (second) specification.<sup>17</sup>

As a further check, I examine the average coefficient on law if I set it equal to the intercept when it no law was passed in a state. This only strengthens my findings. Additionally, I rerun all the results using only firms incorporated in Delaware and then all firms except those in Delaware. In both cases I find that cash holdings significantly decrease after the laws are enacted. Garvey and Hanka (1998) argue that laws passed before 1987 were essentially unenforceable and exclude them from their sample. When I make this adjustment, my results remain unchanged.

Since the regression includes yearly dummy variables, the results can not be driven by macroeconomic changes. However, there is another possible interpretation of the negative coefficient on Law. Although the takeover law is mainly exogenous, it is possible that these laws are passed when the local economy is performing poorly. As such, I may find cash decreasing after laws are enacted simply due to poorer operating performance of the firms covered by the laws. There seems to be some evidence that this is occurring since when I examine the characteristics of firms around the passage of the law, I notice several empirical regularities. First, sales growth of the median firm decreases from 11.59% in the year before passage to 8.09% in the year after. In addition, spending on capital expenditures and acquisitions falls after the passage of the law. In light of the fact that

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<sup>17</sup> There are more than 50 data points since Washington, D.C., US territories, and foreign countries are included in the Compustat incorporation code. The results are no different if I eliminate the territories and foreign country codes from the sample.

firms have less cash, this seems to support the idea that the reason is not spending, but rather a decrease in cash inflows. However, I find that operating income is no different from the year before to the year after the passage of the law which seems to indicate that poorer operating performance is not driving the result. Regardless, the regressions in Table VII take into account both spending (capital expenditures and R&D) and operating performance (cash flow). Thus even if laws do tend to be enacted when state economies are slowing down, the coefficient on Law should be unaffected by that. In addition, the results are unchanged using only firms incorporated in Delaware. However, many of those firms are not geographically located in that state and thus should not be affected by a local economic slowdown. Thus, it does not seem that my results are explained by fluctuations in the business cycle.

The evidence shows that when a firm became covered by a business combination law it reduced its holdings of cash. This is inconsistent with the hypothesis that entrenched management would increase cash holdings for discretionary purposes. However, this is not to say that entrenchment did not occur. Rather, it seems to support the idea that the laws served to entrench management since the fact that managers were willing to hold less cash indicates that they believed the probability of takeover was lower. The reduction in cash supports the idea that an active market for corporate control may lead to larger cash holdings.

## **5. Conclusions**

This paper has provided evidence that contrary to conventional wisdom, the market for corporate control is unable to effectively monitor a firm's cash holdings. Using logistic regressions, I document that the levels of both cash and free cash significantly decrease the probability of being

acquired by reducing the chances of being targeted in the first place. In addition, once a bid is launched, cash holdings may give the target time to find a white knight.

I find that bid premiums are not significantly increasing in cash holdings, instead, they appear to be lower for cash rich firms. The results imply that managers might hold cash in order to entrench themselves. Shareholders appear to derive no benefit from cash holdings since the firm receives takeover bids less frequently and does not obtain higher returns when a bid materializes.

I also examine the impact of antitakeover legislation on corporate cash holdings, and find that after business combination laws go into effect, firms hold significantly less cash than they did before the law was enacted. This supports the argument that the takeover market cannot serve to monitor cash holdings. In fact, an active market for corporate control may encourage higher cash holdings than managers would otherwise maintain.

Future research should examine other measures of managerial entrenchment. Since cash is an entrenchment device, we may see more entrenched management holding less cash. For instance, how do cash holdings change with managerial ownership? Do firms with outsider dominated boards hold more cash? Can institutional ownership monitor the cash holdings of a firm? In addition, it would be interesting to examine the time series of cash as a manager remains in his position. Perhaps older, tenured managers hold less cash than younger, newer ones.

Finally, a theoretical model of bidding is needed which addresses the problems of valuing assets which can be easily disposed. The fact that bid premiums appear to be lower for cash rich firms suggests that this may be a consideration for bidders. Once a suitable model is created, it will allow for richer tests and insight into the unique nature of cash holdings.

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**Table I**  
**Summary Statistics of Quarterly Data**

Cash is defined as cash plus marketable securities. Excess cash to assets is the residual from first pass regressions predicting cash to assets (see the Appendix for first pass regressions). Cash flow is defined as (earnings before interest and taxes plus depreciation and amortization - interest - taxes - common dividends). NWC is defined as (current assets - current liabilities - cash), thus net working capital is measured net of cash. Size is stockholder equity deflated into 1994 dollars using the CPI. Book to market is defined as book assets / (book assets - book equity + market equity). Leverage is (long term debt + short term debt) / equity. ROE is return on equity and measured as (net income / stockholders equity). Sales growth is measured on a year to year basis as  $(sales_t - sales_{t-4}) / (sales_{t-4})$ . Prior Returns is the compounded raw returns for the previous 12 months. Hostile targets are all firm quarters of exchange-listed firms before they were targets of a hostile takeover. Control sample is all firm quarters of exchange-listed firms which were not hostile targets during the sample period. The number of observations appears in brackets under the means. Differences of means are tested using a t-test while differences in medians are tested with a wilcoxon z-test.

Variable	Hostile Targets			Control Sample			t-stat. (p-value)	z-stat (p-value)
	Mean	Median	Std. Dev	Mean	Median	Std. Dev		
Panel A: Cash variables								
Cash / Assets	0.0735 [2,698]	0.0377	0.0944	0.0997 [62,764]	0.0472	0.1334	10.10 (0.0000)	5.95 (0.0000)
Excash / Assets 5	0.0358 [2,698]	0.0033	0.0933	0.0573 [62,764]	0.0074	0.1310	8.43 (0.0000)	2.40 (0.0165)
Excash / Assets 2	0.0228 [2,451]	0.0001	0.0674	0.0365 [50,215]	0.0033	0.0976	7.12 (0.0000)	3.88 (0.0001)
Excash / Assets 1	0.0253 [2,004]	0.0023	0.0664	0.0360 [39,368]	0.0035	0.0958	4.95 (0.0000)	1.48 (0.1389)
Cash Flow / Assets	0.0184 [2,192]	0.0199	0.0209	0.0167 [48,116]	0.0200	0.0343	-2.20 (0.0278)	1.38 (0.1672)
NWC / Assets	0.1391 [2,651]	0.1185	0.1622	0.1526 [59,965]	0.1429	0.1839	3.74 (0.0002)	3.46 (0.0005)
Panel B: Control Variables								
Size	797.1 [2,698]	311.5	1174.6	826.2 [62,740]	118.4	2746.1	0.55 (0.5837)	-23.56 (0.0000)
Book / Market	0.8426 [2,690]	0.8374	0.2251	0.7876 [61,596]	0.8004	0.2881	-9.77 (0.0000)	-9.75 (0.0000)
ROE	0.0105 [2,695]	0.0214	0.1643	-0.0021 [62,687]	0.0251	0.2026	-3.19 (0.0014)	3.17 (0.0015)
Sales Growth	0.0785 [2,694]	0.0477	0.4858	0.1679 [62,165]	0.0705	0.7156	6.42 (0.0000)	9.31 (0.0000)
Prior Returns	0.1704 [2,698]	0.1307	0.4309	0.1458 [62,764]	0.0801	0.4893	-2.57 (0.0102)	-5.84 (0.0000)
Leverage	1.1802 [2,521]	0.6857	2.0429	1.2262 [54,731]	0.6255	2.3847	0.95 (0.3410)	-5.09 (0.0000)

**Table II**  
Correlation Table

The table presents the simple pair wise correlations among the variables. ROE is defined as net income divided by equity. Sales growth is the growth rate in sales this quarter based on the sales in the same quarter of the previous year. Size is stockholder equity deflated into 1994 dollars using the CPI. Book to Market is defined as book assets / (book assets - book equity + market equity). Debt / Equity is short term plus long term debt divided by equity. Cash flow is defined as (earnings before interest and taxes plus depreciation and amortization - interest - taxes - common dividends). Prior Returns is the compounded raw return from the previous 12 months. Cash is defined as cash plus marketable securities. Excash is a measure of excess cash to assets using the residual from first pass regressions predicting cash to assets (see the Appendix for first pass regressions). The number in parentheses is the p-value for a test that the correlation equals zero.

	ROE	Sales Growth	NWC / Assets	Debt / Equity	Book / Market	Size	Cash flow / Assets	Prior Returns	Cash / Assets	Excash5 / Assets	Excash2 / Assets
ROE	1.0000										
Sales Growth	0.0383 (0.0000)	1.0000									
NWC / assets	0.1281 (0.0000)	-0.0330 (0.0000)	1.0000								
Debt / Equity	-0.3082 (0.0000)	0.0092 (0.0280)	-0.2036 (0.0000)	1.0000							
Book / Market	-0.0604 (0.0000)	-0.1338 (0.0000)	0.0672 (0.0000)	0.0638 (0.0000)	1.0000						
Size	0.0437 (0.0000)	-0.0353 (0.0000)	-0.1635 (0.0000)	-0.0527 (0.0000)	-0.0247 (0.0000)	1.0000					
Cash flow / Assets	0.4507 (0.0000)	0.0085 (0.0571)	0.0951 (0.0000)	-0.1452 (0.0000)	-0.1518 (0.0000)	0.0735 (0.0000)	1.0000				
Prior Returns	0.1491 (0.0000)	0.1578 (0.0000)	0.0262 (0.0000)	-0.0628 (0.0000)	-0.3548 (0.0000)	0.0130 (0.0009)	0.1662 (0.0001)	1.0000			
Cash / Assets	0.0069 (0.0789)	0.0741 (0.0000)	-0.1606 (0.0000)	-0.1076 (0.0000)	-0.2088 (0.0000)	-0.0646 (0.0000)	-0.1808 (0.0000)	0.0696 (0.0000)	1.0000		
Excash5 / Assets	0.0206 (0.0000)	0.0658 (0.0000)	-0.1816 (0.0000)	-0.1083 (0.0004)	-0.2120 (0.0000)	-0.0300 (0.0000)	-0.1594 (0.0005)	0.0705 (0.0000)	0.9953 (0.0000)	1.0000	
Excash2 / Assets	0.0483 (0.0000)	0.0313 (0.0000)	-0.0729 (0.0000)	-0.0181 (0.0004)	-0.0851 (0.0000)	-0.0561 (0.0000)	-0.0171 (0.0005)	0.0373 (0.0000)	0.8860 (0.0000)	0.8883 (0.0000)	1.0000
Excash1 / Assets	0.0392 (0.0000)	0.0294 (0.0000)	-0.0793 (0.0000)	-0.0174 (0.0004)	-0.0803 (0.0000)	-0.0582 (0.0000)	-0.0239 (0.0001)	0.0371 (0.0000)	0.8823 (0.0000)	0.8836 (0.0000)	0.9957 (0.0000)

### **Table III**

#### **Logistic regressions determining likelihood of hostile acquisition**

The dependent variable is set equal to 1 if a successful hostile takeover is announced for a firm in a given quarter and set to 0 otherwise. A takeover is determined to be successful if the firm is eventually acquired even if by other than the hostile bidder. The sample includes all hostile takeover activity from 1985-1994 as reported in Comment and Schwert (1998) where a takeover attempt is hostile if SDC reports is as such. The control sample includes all exchange listed firm quarters from 1985-1994. All specifications include annual dummies as well as dummies for three of the four quarters to account for seasonality. ROE is defined as net income divided by equity. Sales growth is the growth rate in sales this quarter based on the sales in the same quarter of the previous year. Size is stockholder equity deflated into 1994 dollars using the CPI. Book to Market is defined as book assets / (book assets - book equity + market equity). Cash is defined as cash plus marketable securities. Excess cash to assets is the residual from first pass regressions predicting cash to assets (see the Appendix for first pass regressions). The residuals are separated by sign, thus Positive (Negative) excess cash equals excess cash when the residual is positive (negative) and zero otherwise. Debt / Equity is short term plus long term debt divided by equity. Cash flow is defined as (earnings before interest and taxes plus depreciation and amortization - interest - taxes - common dividends). Prior returns is the compounded raw return from the previous 12 months. In Panel B, High BM is a dummy variable which equals one if the firm is in the highest quartile of book to market of all firms for that quarter. The numbers in parentheses are z-statistics which are obtained using robust standard errors. Takeovers in the last row gives the number of successful hostile takeovers in the regression. Panels C and D replicate the earlier panels except that the takeover is defined to be successful if the hostile bidder acquires control.

Panel A:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE	0.0003 (0.04)	-0.0005 (-0.09)	-0.0013 (-0.21)	-0.0028 (-0.44)	-0.0075 (-1.30)	-0.0076 (-1.34)	-0.0082 (-1.40)	-0.0081 (-1.39)
Sales growth	-0.0027 (-1.20)	-0.0028 (-1.22)	-0.0022 (-1.00)	-0.0011 (-0.67)	-0.0015 (-0.76)	-0.0015 (-0.78)	-0.0015 (-0.73)	-0.0015 (-0.73)
Debt / Equity	-0.0016 (-1.31)	-0.0015 (-1.31)	-0.0024 (-1.70)	-0.0022 (-1.48)	-0.0020 (-1.41)	-0.0018 (-1.39)	-0.0021 (-1.43)	-0.0021 (-1.43)
Book to Market	0.5128 (1.69)	0.5752 (1.92)	0.6628 (2.12)	0.4444 (1.17)	0.7250 (1.88)	0.7626 (1.97)	0.7402 (1.88)	0.7326 (1.86)
Size	-0.0001 (-1.91)	-0.0001 (-2.26)	-0.0001 (-1.86)	-0.0001 (-2.37)	-0.0001 (-2.51)	-0.0001 (-2.58)	-0.0001 (-2.55)	-0.0001 (-2.55)
Prior Returns	0.0015 (0.77)	0.0014 (0.74)	0.0017 (0.84)	-0.0010 (-0.46)	-0.0014 (-0.60)	-0.0014 (-0.61)	-0.0014 (-0.62)	-0.0014 (-0.62)
Cash flow / Assets					0.1157 (2.38)	0.1135 (2.32)	0.1146 (2.33)	0.1141 (2.32)
NWC / Assets					-0.0043 (-0.67)	-0.0023 (-0.36)	-0.0052 (-0.82)	-0.0052 (-0.82)
Cash / Assets	-0.0248 (-2.33)				-0.0220 (-1.68)			
Positive Excess Cash 5 / Assets		-0.0390 (-2.72)				-0.0302 (-1.91)		
Negative Excess Cash 5 / Assets		0.1520 (2.20)				0.1045 (1.41)		
Positive Excess Cash 2 / Assets			-0.0356 (-2.31)				-0.0297 (-1.68)	
Negative Excess Cash 2 / Assets			0.0973 (1.41)				0.0807 (1.12)	
Positive Excess Cash 1 / Assets				-0.0298 (-1.86)				-0.0299 (-1.72)
Negative Excess Cash 1 / Assets				0.0802 (0.98)				0.0893 (1.11)
N	50,623	50,623	47,501	37,099	37,445	37,445	37,099	37,099
Pseudo R <sup>2</sup>	5.31%	5.57%	5.32%	6.34%	6.67%	6.77%	6.71%	6.71%
Takeovers	91	91	89	72	72	72	72	72

Panel B:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE	0.0003 (0.06)	-0.0005 (-0.09)	-0.0014 (-0.22)	-0.0028 (-0.45)	-0.0078 (-1.34)	-0.0081 (-1.40)	-0.0086 (-1.43)	-0.0085 (-1.43)
Sales growth	-0.0028 (-1.18)	-0.0029 (-1.21)	-0.0023 (-0.99)	-0.0011 (-0.66)	-0.0015 (-0.74)	-0.0016 (-0.78)	-0.0015 (-0.73)	-0.0015 (-0.73)
Debt / Equity	-0.0017 (-1.33)	-0.0016 (-1.37)	-0.0025 (-1.74)	-0.0023 (-1.50)	-0.0021 (-1.45)	-0.0019 (-1.45)	-0.0022 (-1.46)	-0.0022 (-1.46)
Book to Market	1.0687 (2.75)	1.4385 (3.71)	1.1961 (2.76)	0.8289 (1.68)	1.3414 (2.93)	1.6287 (3.43)	1.1325 (2.29)	1.1493 (2.31)
Size	-0.0001 (-1.93)	-0.0001 (-2.30)	-0.0001 (-1.91)	-0.0001 (-2.37)	-0.0001 (-2.53)	-0.0001 (-2.58)	-0.0001 (-2.56)	-0.0001 (-2.56)
Prior Returns	0.0017 (0.86)	0.0014 (0.72)	0.0018 (0.89)	-0.0009 (-0.41)	-0.0012 (-0.54)	-0.0014 (-0.61)	-0.0013 (-0.58)	-0.0013 (-0.58)
Cash flow / Assets					0.1196 (2.46)	0.1180 (2.39)	0.1177 (2.40)	0.1173 (2.39)
NWC / Assets					-0.0048 (-0.75)	-0.0023 (-0.35)	-0.0058 (-0.89)	-0.0057 (-0.89)
Cash / Assets	-0.0139 (-1.31)				-0.0100 (-0.78)			
High BM * Cash / Assets	-0.0739 (-1.69)				-0.0848 (-1.62)			
Positive Excess Cash 5 / Assets		-0.0238 (-1.72)				-0.0147 (-0.96)		
High BM * Positive Excess Cash 5		-0.1022 (-1.77)				-0.1111 (-1.63)		
Negative Excess Cash 5 / Assets		0.0710 (0.92)				0.0378 (0.46)		
High BM * Negative Excess Cash 5		0.3342 (2.20)				0.2821 (1.81)		
Positive Excess Cash 2 / Assets			-0.0226 (-1.50)				-0.0179 (-1.03)	
High BM * Positive Excess Cash 2			-0.0902 (-1.50)				-0.0829 (-1.22)	
Negative Excess Cash 2 / Assets			0.0696 (1.12)				0.0731 (1.06)	
High BM * Negative Excess Cash 2			0.1323 (0.68)				0.0524 (0.30)	
Positive Excess Cash 1 / Assets				-0.0187 (-1.20)				-0.0179 (-1.06)
High BM * Positive Excess Cash 1				-0.0790 (-1.20)				-0.0857 (-1.24)
Negative Excess Cash 1 / Assets				0.0707 (0.93)				0.0807 (1.06)
High BM * Negative Excess Cash 1				0.0587 (0.29)				0.0621 (0.31)
N	50,623	50,623	47,501	37,099	37,445	37,445	37,099	37,099
Pseudo R <sup>2</sup>	5.62%	6.19%	5.58%	6.53%	7.05%	7.34%	6.90%	6.93%
Takeovers	91	91	89	72	72	72	72	72

Panel C:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE	0.0032 (0.33)	0.0018 (0.20)	0.0033 (0.34)	-0.0020 (-0.24)	-0.0088 (-1.44)	-0.0088 (-1.43)	-0.0091 (-1.45)	-0.0090 (-1.45)
Sales growth	-0.0067 (-2.35)	-0.0067 (-2.36)	-0.0068 (-2.30)	-0.0049 (-1.90)	-0.0069 (-2.24)	-0.0069 (-2.23)	-0.0070 (-2.23)	-0.0070 (-2.23)
Debt / Equity	-0.0025 (-1.11)	-0.0022 (-1.09)	-0.0020 (-0.96)	-0.0023 (-0.85)	-0.0021 (-0.80)	-0.0018 (-0.78)	-0.0021 (-0.80)	-0.0021 (-0.81)
Book to Market	-0.4515 (-0.10)	0.0465 (0.10)	0.0568 (0.12)	-0.0951 (-0.16)	0.5691 (0.98)	0.6263 (1.07)	0.5828 (0.99)	0.5777 (0.97)
Size	-0.0000 (-1.09)	-0.0001 (-1.54)	-0.0000 (-1.11)	-0.0001 (-1.50)	-0.0001 (-1.72)	-0.0001 (-1.82)	-0.0001 (-1.77)	-0.0001 (-1.76)
Prior Returns	-0.0045 (-0.16)	-0.0005 (-0.18)	-0.0004 (-0.12)	-0.0027 (-0.83)	-0.0032 (-0.97)	-0.0033 (-0.99)	-0.0033 (-0.99)	-0.0033 (-0.99)
Cash flow / Assets					0.2462 (4.43)	0.2441 (4.32)	0.2450 (4.29)	0.2448 (4.30)
NWC / Assets					-0.0108 (-1.28)	-0.0081 (-0.93)	-0.0117 (-1.38)	-0.0116 (-1.38)
Cash / Assets	-0.0429 (-2.65)				-0.0333 (-1.81)			
Positive Excess Cash 5 / Assets		-0.0762 (-2.93)				-0.0590 (-2.18)		
Negative Excess Cash 5 / Assets		0.2523 (2.66)				0.2115 (2.02)		
Positive Excess Cash 2 / Assets			-0.0652 (-2.44)				-0.0504 (-1.86)	
Negative Excess Cash 2 / Assets			0.0801 (0.84)				0.0641 (0.68)	
Positive Excess Cash 1 / Assets				-0.0470 (-1.98)				-0.0495 (-1.87)
Negative Excess Cash 1 / Assets				0.0439 (0.41)				0.0692 (0.65)
N	39,865	39,865	37,493	28,868	29,143	29,143	28,868	28,868
Pseudo R <sup>2</sup>	3.80%	4.53%	3.73%	5.01%	6.60%	7.10%	6.65%	6.65%
Takeovers	47	47	47	38	38	38	38	38

Panel D:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE	0.0034 (0.33)	0.0019 (0.20)	0.0035 (0.35)	-0.0018 (-0.21)	-0.0091 (-1.47)	-0.0092 (-1.47)	-0.0094 (-1.48)	-0.0092 (-1.47)
Sales growth	-0.0069 (-2.34)	-0.0068 (-2.37)	-0.0068 (-2.27)	-0.0048 (-1.87)	-0.0070 (-2.23)	-0.0070 (-2.22)	-0.0070 (-2.20)	-0.0070 (-2.19)
Debt / Equity	-0.0026 (-1.12)	-0.0023 (-1.12)	-0.0020 (-0.97)	-0.0023 (-0.85)	-0.0022 (-0.83)	-0.0018 (-0.80)	-0.0021 (-0.82)	-0.0021 (-0.82)
Book to Market	0.5562 (0.90)	0.7108 (1.24)	0.0717 (0.13)	-0.2828 (-0.45)	1.0704 (1.61)	1.0921 (1.66)	0.4326 (0.72)	0.4633 (0.75)
Size	-0.0000 (-1.11)	-0.0001 (-1.54)	-0.0000 (-1.05)	-0.0001 (-1.42)	-0.0001 (-1.72)	-0.0001 (-1.79)	-0.0001 (-1.69)	-0.0001 (-1.69)
Prior Returns	-0.0003 (-0.11)	-0.0005 (-0.16)	-0.0003 (-0.10)	-0.0027 (-0.82)	-0.0031 (-0.94)	-0.0033 (-0.96)	-0.0033 (-0.99)	-0.0032 (-0.98)
Cash flow / Assets					0.2490 (4.55)	0.2469 (4.42)	0.2447 (4.35)	0.2450 (4.36)
NWC / Assets					-0.0113 (-1.33)	-0.0083 (-0.94)	-0.0117 (-1.38)	-0.0117 (-1.38)
Cash / Assets	-0.0308 (-1.97)				-0.0221 (-1.22)			
High BM * Cash / Assets	-0.1004 (-1.17)				-0.0759 (-1.03)			
Positive Excess Cash 5 / Assets		-0.0598 (-2.45)				-0.0456 (-1.73)		
High BM * Positive Excess Cash 5		-0.1383 (-1.02)				-0.1057 (-0.86)		
Negative Excess Cash 5 / Assets		0.2010 (1.91)				0.2002 (1.58)		
High BM * Negative Excess Cash 5		0.2000 (1.04)				0.0848 (0.43)		
Positive Excess Cash 2 / Assets			-0.0573 (-2.18)				-0.0457 (-1.65)	
High BM * Positive Excess Cash 2			-0.0706 (-0.70)				-0.0506 (-0.56)	
Negative Excess Cash 2 / Assets			0.1129 (1.30)				0.1195 (1.24)	
High BM * Negative Excess Cash 2			-0.0884 (-0.46)				-0.1359 (-0.89)	
Positive Excess Cash 1 / Assets				-0.0435 (-1.80)				-0.0440 (-1.65)
High BM * Positive Excess Cash 1				-0.0404 (-0.48)				-0.0538 (-0.58)
Negative Excess Cash 1 / Assets				0.1051 (1.00)				0.1282 (1.22)
High BM * Negative Excess Cash 1				-0.1661 (-0.92)				-0.1495 (-0.84)
N	39,865	39,865	37,493	28,868	29,143	29,143	28,868	28,868
Pseudo R <sup>2</sup>	4.14%	4.89%	3.88%	5.22%	6.85%	7.32%	6.87%	6.87%
Takeovers	47	47	47	38	38	38	38	38

#### **Table IV**

##### **Logistic regressions determining likelihood of being targeted**

The dependent variable is set equal to 1 if a hostile takeover attempt is announced for a firm in a given quarter and set to 0 otherwise. The sample includes all hostile takeover activity from 1985-1994 as reported in Comment and Schwert (1998). A takeover attempt is defined as hostile if SDC reports it as such. The control sample includes all exchange listed firm quarters from 1985-1994. All specifications include annual dummies as well as dummies for three of the four quarters to account for seasonality. ROE is defined as net income divided by equity. Sales growth is the growth rate in sales this quarter based on the sales in the same quarter of the previous year. Size is stockholder equity deflated into 1994 dollars using the CPI. Book to Market is defined as book assets / (book assets - book equity + market equity). Cash is defined as cash plus marketable securities. Excess cash to assets is the residual from first pass regressions predicting cash to assets (see the Appendix for first pass regressions). The residuals are separated by sign, thus Positive (Negative) excess cash equals excess cash when the residual is positive (negative) and zero otherwise. Debt / Equity is short term plus long term debt divided by equity. Cash flow is defined as (earnings before interest and taxes plus depreciation and amortization - interest - taxes - common dividends). Prior returns is the compounded raw return from the previous 12 months. In Panel B, High BM is a dummy variable which equals one if the firm is in the highest quartile of book to market of all firms for that quarter. The numbers in parentheses are z-statistics which are obtained using robust standard errors. Takeovers in the last row gives the number of takeover attempts in the regression.

Panel A:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE	-0.0002 (-0.04)	-0.0008 (-0.19)	-0.0002 (-0.05)	-0.0035 (-0.75)	-0.0067 (-1.43)	-0.0068 (-1.48)	-0.0071 (-1.51)	-0.0071 (-1.50)
Sales growth	-0.0060 (-1.94)	-0.0059 (-1.96)	-0.0056 (-1.79)	-0.0029 (-1.20)	-0.0033 (-1.26)	-0.0033 (-1.29)	-0.0033 (-1.25)	-0.0032 (-1.25)
Debt / Equity	-0.0019 (-1.82)	-0.0017 (-1.81)	-0.0019 (-2.04)	-0.0022 (-1.98)	-0.0026 (-2.06)	-0.0024 (-2.01)	-0.0024 (-1.97)	-0.0025 (-1.99)
Book to Market	0.6802 (2.33)	0.7349 (2.55)	0.8748 (2.98)	0.7229 (2.06)	0.8672 (2.46)	0.8969 (2.55)	0.9137 (2.58)	0.9063 (2.56)
Size	-0.0000 (-0.81)	-0.0000 (-1.23)	-0.0000 (-0.80)	-0.0000 (-1.66)	-0.0001 (-2.13)	-0.0001 (-2.19)	-0.0001 (-2.15)	-0.0001 (-2.16)
Prior Returns	0.0042 (2.33)	0.0042 (2.30)	0.0045 (2.43)	0.0015 (0.76)	0.0014 (0.65)	0.0013 (0.64)	0.0013 (0.62)	0.0013 (0.62)
Cash flow / Assets					0.0767 (1.90)	0.0755 (1.87)	0.0767 (1.92)	0.0763 (1.91)
NWC / Assets					-0.0083 (-1.57)	-0.0068 (-1.27)	-0.0080 (-1.47)	-0.0081 (-1.51)
Cash / Assets	-0.0345 (-3.32)				-0.0296 (-2.51)			
Positive Excess Cash 5 / Assets		-0.0467 (-3.46)				-0.0342 (-2.49)		
Negative Excess Cash 5 / Assets		0.1167 (2.12)				0.0668 (1.10)		
Positive Excess Cash 2 / Assets			-0.0355 (-2.76)				-0.0305 (-2.12)	
Negative Excess Cash 2 / Assets			0.0099 (0.26)				0.0316 (0.63)	
Positive Excess Cash 1 / Assets				-0.0286 (-2.18)				-0.0314 (-2.22)
Negative Excess Cash 1 / Assets				0.0226 (0.43)				0.0385 (0.71)
N	55,950	55,950	52,455	41,219	41,613	41,613	41,219	41,219
Pseudo R <sup>2</sup>	7.45%	7.55%	7.21%	7.67%	8.07%	8.03%	7.93%	7.95%
Takeovers	136	136	134	107	107	107	107	107

Panel B:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ROE	-0.0001 (-0.03)	-0.0008 (-0.18)	-0.0002 (-0.05)	-0.0035 (-0.75)	-0.0068 (-1.44)	-0.0071 (-1.51)	-0.0073 (-1.53)	-0.0072 (-1.52)
Sales growth	-0.0061 (-1.95)	-0.0061 (-1.86)	-0.0057 (-1.80)	-0.0029 (-1.19)	-0.0033 (-1.26)	-0.0034 (-1.30)	-0.0033 (-1.26)	-0.0033 (-1.25)
Debt / Equity	-0.0019 (-1.83)	-0.0018 (-1.86)	-0.0019 (-2.05)	-0.0023 (-1.98)	-0.0026 (-2.08)	-0.0025 (-2.06)	-0.0024 (-1.98)	-0.0025 (-2.00)
Book to Market	0.9218 (2.70)	1.3000 (3.95)	1.0750 (3.20)	0.8313 (2.10)	1.1529 (2.79)	1.4398 (3.54)	1.0035 (2.53)	1.0411 (2.61)
Size	-0.0000 (-0.83)	-0.0000 (-1.27)	-0.0000 (-0.81)	-0.0000 (-1.62)	-0.0001 (-2.15)	-0.0001 (-2.21)	-0.0001 (-2.11)	-0.0001 (-2.13)
Prior Returns	0.0043 (2.39)	0.0041 (2.26)	0.0045 (2.47)	0.0016 (0.79)	0.0014 (0.68)	0.0013 (0.62)	0.0014 (0.65)	0.0014 (0.66)
Cash flow / Assets					0.0782 (1.93)	0.0776 (1.90)	0.0781 (1.95)	0.0777 (1.93)
NWC / Assets					-0.0085 (-1.62)	-0.0067 (-1.25)	-0.0081 (-1.50)	-0.0083 (-1.54)
Cash / Assets	-0.0281 (-2.44)				-0.0222 (-1.72)			
High BM * Cash / Assets	-0.0296 (-1.09)				-0.0352 (-1.14)			
Positive Excess Cash 5 / Assets		-0.0354 (-2.48)				-0.0232 (-1.58)		
High BM * Positive Excess Cash 5		-0.0501 (-1.38)				-0.0516 (-1.31)		
Negative Excess Cash 5 / Assets		0.0464 (0.74)				0.0095 (0.14)		
High BM * Negative Excess Cash 5		0.2376 (2.27)				0.1944 (1.71)		
Positive Excess Cash 2 / Assets			-0.0280 (-2.00)				-0.0235 (-1.52)	
High BM * Positive Excess Cash 2			-0.0361 (-1.05)				-0.0371 (-0.95)	
Negative Excess Cash 2 / Assets			0.0027 (0.08)				0.0427 (0.89)	
High BM * Negative Excess Cash 2			0.0303 (0.29)				-0.0265 (-0.25)	
Positive Excess Cash 1 / Assets				-0.0220 (-1.56)				-0.0239 (-1.57)
High BM * Positive Excess Cash 1				-0.0346 (-0.92)				-0.0387 (-0.99)
Negative Excess Cash 1 / Assets				0.0299 (0.59)				0.0456 (0.86)
High BM * Negative Excess Cash 1				-0.0189 (-0.15)				-0.0141 (-0.12)
N	55,950	55,950	52,455	41,219	41,613	41,613	41,219	41,219
Pseudo R <sup>2</sup>	7.51%	7.84%	7.26%	7.73%	8.16%	8.28%	8.00%	8.02%
Takeovers	136	136	134	107	107	107	107	107

## Table V

### Logistic regressions determining likelihood of takeover completion

In Panel A, the dependent variable is set equal to 1 if an announced hostile takeover is eventually completed without regard to the winner and set to 0 otherwise. In Panel B, the dependent variable is set to 1 if the hostile bidder acquires control and 0 otherwise. The sample includes all hostile takeover activity from 1985-1994 as reported in Comment and Schwert (1998). A takeover attempt is defined as hostile if SDC reports it as such. All specifications include time dummies for each year as well as dummies for three of the four quarters to account for seasonality. Pill equals one if the target had a pill in place and zero otherwise. Cash offer equals one if the bid was for all cash. Tender offer equals one if the bid was made as a tender offer. Auction equals one if there were multiple bidders for the firm. Toehold is the percentage of the target's outstanding shares that the hostile bidder owned prior to the bid. If Toehold cannot be determined, it is set to zero. Premium is the premium offered for the target by the hostile acquirer measured relative to the target's stock price 20 trading days before the announcement of the bid. Cash is defined as cash plus marketable securities. Excess cash to assets is the residual from first pass regressions predicting cash to assets (see the Appendix for first pass regressions). The residuals are separated by sign, thus Positive (Negative) excess cash equals excess cash when the residual is positive (negative) and zero otherwise. The numbers in parentheses are z-statistics which are obtained using robust standard errors. Completed in the last row gives the number of takeovers completed in the regression.

	<b>Panel A: Completion without regard to winner</b>				<b>Panel B: Completion if the hostile bidder wins</b>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pill	1.1678 (1.68)	1.0174 (1.44)	0.7793 (0.95)	0.8682 (0.88)	1.3470 (1.96)	1.2120 (1.68)	1.3329 (1.54)	1.5398 (1.34)
Cash Offer	-0.7472 (-0.82)	-0.6345 (-0.72)	-1.1144 (-1.14)	-1.8479 (-1.43)	0.1984 (0.21)	0.5279 (0.54)	0.7909 (0.57)	1.3080 (1.24)
Tender Offer	4.5028 (5.51)	4.5576 (5.17)	4.7371 (5.52)	5.0891 (3.69)	3.6373 (4.00)	3.5447 (3.85)	4.4676 (3.55)	5.7393 (2.67)
Auction	0.8343 (1.28)	0.7511 (1.16)	0.3259 (0.45)	0.2941 (0.36)	-3.1479 (-4.88)	-3.2713 (-4.68)	-3.9258 (-5.76)	-4.7773 (-4.93)
Toehold	-0.0441 (-1.16)	-0.0315 (-0.83)	-0.0373 (-0.93)	-0.0083 (-0.22)	-0.0134 (-0.28)	0.0085 (0.18)	0.0074 (0.12)	0.0386 (0.52)
Premium	-2.1051 (-1.36)	-2.3292 (-1.39)	-3.8942 (-2.02)	-3.9465 (-2.03)	6.0758 (3.56)	6.4290 (3.48)	7.0733 (3.29)	8.3927 (3.24)
Cash / Assets	-0.3202 (-0.08)				-2.6368 (-0.80)			
Positive Excess Cash 5 / Assets		-4.3047 (-0.90)				-9.3380 (-1.93)		
Negative Excess Cash 5 / Assets		25.5213 (1.19)				39.3330 (1.56)		
Positive Excess Cash 2 / Assets			-6.609 (-0.77)				-9.8802 (-1.71)	
Negative Excess Cash 2 / Assets			41.1439 (2.05)				34.0689 (1.74)	
Positive Excess Cash 1 / Assets				-2.0873 (-0.23)				-7.3089 (-1.11)
Negative Excess Cash 1 / Assets				38.7131 (1.72)				31.3766 (1.30)
N	133	133	122	96	130	130	120	94
Pseudo R <sup>2</sup>	48.15%	48.83%	52.67%	49.12%	44.10%	46.09%	51.37%	56.94%
Completed	89	89	84	68	51	51	47	38

## **Table VI**

### **Determinants of Bid Premiums**

The dependent variable is bid premium which is defined as the premium of the bid price over the stock price of the target firm 20 trading days before the date of the announcement of a hostile takeover. When hostile premium is indicated, it means that I use the bid premium offered by the hostile bidder, otherwise I use the highest bid premium received by the firm in the control contest. All specifications include dummies for each year as well as dummies for three of the four calendar quarters to account for seasonality. Pill is a dummy variable which equals one if the firm had a poison pill in place and zero otherwise. Auction is a dummy variable which equals one if there were multiple bidders and zero otherwise. Cash offer is a dummy which equals one if the bid is all cash and zero otherwise. Tender offer is a dummy variable which equals one if the deal is a tender offer and zero otherwise. Excess cash to assets is the residual from first pass regressions predicting cash to assets (see the Appendix for first pass regressions). The residuals are separated by sign, thus Positive (Negative) excess cash equals excess cash when the residual is positive (negative) and zero otherwise. Cash / assets is  $(\text{cash} + \text{marketable securities}) / \text{total assets}$ . Leverage is defined as  $(\text{long-term} + \text{short-term debt}) / \text{total assets}$ . Book to Market is defined as  $\text{book assets} / (\text{book assets} - \text{book equity} + \text{market equity})$ . Toehold is the percentage of the target's outstanding shares that the hostile bidder owned prior to the bid. If Toehold cannot be determined, it is set to zero. The t-statistics are calculated using White's (1980) correction.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pill	-0.0093 (-0.26)	-0.0560 (-1.30)	-0.0061 (-0.17)	-0.0544 (-1.25)	-0.0080 (-0.23)	-0.0609 (-1.43)	-0.0184 (-0.50)	-0.0166 (-0.45)
Auction	0.0453 (1.38)	0.1398 (4.54)	0.0448 (1.34)	0.1391 (4.41)	0.0541 (1.67)	0.1461 (4.83)	0.0698 (1.63)	0.1521 (3.89)
Cash Offer	-0.0505 (-1.26)	-0.0540 (-1.30)	-0.0528 (-1.34)	-0.0555 (-1.38)	-0.0474 (-1.17)	-0.0566 (-1.35)	-0.0500 (-1.03)	-0.0664 (-1.34)
Tender Offer	-0.0414 (-0.91)	0.0187 (0.41)	-0.0417 (-0.93)	0.0183 (0.40)	-0.0364 (-0.81)	0.0293 (0.65)	-0.0701 (-1.11)	-0.0128 (-0.21)
Leverage	-0.0550 (-0.38)	-0.1107 (-0.75)	-0.0502 (-0.33)	-0.1039 (-0.69)	-0.0461 (-0.29)	-0.1423 (-0.95)	-0.1495 (-0.68)	-0.2235 (-1.04)
Book to Market	-0.0396 (-0.36)	-0.0689 (-0.66)	-0.0430 (-0.39)	-0.0709 (-0.69)	-0.0615 (-0.57)	-0.0935 (-0.92)	-0.0147 (-0.13)	-0.1358 (-1.28)
Toehold	-0.0015 (-0.81)	-0.0007 (-0.34)	-0.0015 (-0.82)	-0.0008 (-0.36)	-0.0018 (-0.96)	-0.0011 (-0.50)	-0.0015 (-0.75)	-0.0009 (-0.37)
Cash / Assets	-0.4303 (-1.77)	-0.4244 (-1.84)						
Positive Excess Cash 5 / Assets			-0.3823 (-1.26)	-0.4056 (-1.38)				
Negative Excess Cash 5 / Assets			-0.4409 (-0.28)	-0.2447 (-0.16)				
Positive Excess Cash 2 / Assets					-0.4680 (-1.44)	-0.4543 (-1.52)		
Negative Excess Cash 2 / Assets					-0.4659 (-0.38)	-0.6041 (-0.54)		
Positive Excess Cash 1 / Assets							-0.3451 (-0.90)	-0.3481 (-1.00)
Negative Excess Cash 1 / Assets							-1.5701 (-1.13)	-1.6107 (-1.24)
N	129	129	129	129	127	127	100	100
Adjusted R <sup>2</sup>	20.21%	28.16%	19.91%	27.88%	22.66%	31.29%	27.61%	33.73%
Hostile premium	yes	no	yes	no	yes	no	yes	no

## **Table VII**

### **Effect of Anti-Takeover Laws on Cash Holdings**

The dependent variable is the natural logarithm of cash / assets. Annual data is used from 1971-1994. The fixed effects regression is run with firm specific dummy variables. The industry-adjusted regression is run with dummies for each industry, defined by 2 digit SIC code. State average means that a pooled time-series cross-sectional regression is run for each location of incorporation and then the inferences are obtained using the average of the coefficients. Market to book is defined as (book assets - book equity + market equity) / book assets. Real size is the natural logarithm of real assets where real assets are deflated into 1994 dollars using the CPI. Cash flow is defined as (earnings before interest and taxes + depreciation and amortization - interest - taxes - common dividends). NWC is calculated without cash, thus it is (current assets - current liabilities - cash and marketable securities). Total leverage is long term plus short term debt divided by total assets. Industry Sigma is the mean of the standard deviations of cash flow / (assets-cash) over 20 years for firms in the same industry defined by 2 digit SIC codes. Dividend dummy is a variable set to 1 if a firm paid a dividend and 0 otherwise. Regulation dummy is a variable set to 1 if the firm is in a regulated industry in that year and 0 otherwise. Law is a dummy variable which equals one if the firm is incorporated in a state with a business combination law during or after the year that the law took effect. When time dummies is yes, it indicates that the regression is run with annual dummy variables to control for macroeconomic factors. White's correction for heteroscedasticity is used to calculate the t-statistics.

	Fixed Effects		Industry Adjusted		OLS		State Average	
Market to Book	0.0965 (20.66)	0.1157 (24.41)	0.1260 (28.22)	0.1893 (40.16)	0.1339 (30.22)	0.1989 (42.38)	0.0639 (1.54)	0.1336 (3.47)
Real Size	-0.0655 (-9.10)	-0.1567 (-21.76)	-0.0303 (-10.81)	-0.0615 (-22.90)	-0.0377 (-13.80)	-0.0689 (-26.72)	-0.1660 (-2.97)	-0.2162 (-3.92)
Cash flow / assets	0.5099 (13.72)	0.9557 (25.93)	0.5523 (13.28)	1.0932 (26.77)	0.6190 (15.02)	1.1499 (28.53)	0.7279 (2.64)	1.9483 (6.92)
NWC / assets	-1.2793 (-43.32)	-0.5332 (-18.50)	-1.4526 (-45.66)	-0.5329 (-16.46)	-1.4543 (-53.66)	-0.5225 (-20.16)	-1.5254 (-5.91)	-0.7942 (-2.69)
Capex / assets	-1.2043 (-19.70)		-1.7291 (-24.63)		-1.8701 (-27.55)		-2.0683 (-4.75)	
Leverage	-2.2318 (-77.81)		-2.7710 (-101.41)		-2.7449 (-102.59)		-2.8203 (-15.19)	
Industry Sigma	-0.4467 (-5.60)	-0.2916 (-3.50)	0.0828 (0.95)	0.4980 (5.30)	0.6318 (9.38)	1.1650 (16.15)	-0.4177 (-1.06)	-0.3820 (-0.69)
R&D / Sales	0.8117 (11.80)	1.0488 (15.06)	1.3032 (19.17)	1.8420 (26.08)	1.4032 (20.57)	1.9689 (27.47)	-2.4798 (-0.56)	-2.1595 (-0.50)
Dividend Dummy	0.0639 (5.04)		-0.0702 (-6.93)		-0.0835 (-8.30)		0.0822 (1.00)	
Regulation Dummy	-0.0736 (-1.43)	-0.1834 (-3.42)	-0.2448 (-3.62)	-0.2882 (-5.14)	-0.0835 (-2.72)	-0.3013 (-7.08)	-0.1413 (-1.58)	-0.2052 (-2.25)
Law	-0.1110 (-7.12)	-0.1303 (-8.02)	-0.0244 (-1.56)	-0.0731 (-4.36)	-0.0070 (-0.44)	-0.0559 (-3.30)	-0.1421 (-2.95)	-0.1391 (-2.93)
N	87,135	87,871	87,135	87,871	87,135	87,871	55	55
Adj. R <sup>2</sup>	0.6164	0.5805	0.2394	0.1041	0.2234	0.0845	0.3711	0.2140
Time Dummies	yes	yes	yes	yes	yes	yes	no	no

## **Appendix**

### **Determinants of cash holdings**

OPSW develop a model for cash holdings so that they can determine levels of excess cash. I use three variations of their specification here for the quarterly data, but the regulation dummy is omitted. Also, they deflate by (assets-cash) which they call net assets, while I deflate all variables by assets. Table A1 shows the results of these specifications with the natural log of cash divided by assets as the dependent variable. Since the t-statistics are likely overstated in any pooled time-series cross section regression, I run all the models using the method of Fama and MacBeth (1973) where I run a cross sectional regression each quarter and examine the time series of coefficients. The inferences of the full model (excess cash 1) are substantially similar to that obtained in OPSW using annual data (see their Table 5) and explains roughly 18% of the variation. One difference is that capital expenditures are negatively related to cash on a quarterly basis while it is insignificantly positive on an annual basis. Since the calculation of cash flow is missing for some firm quarters, I rerun the results omitting the cash flow variable (excess cash 2). In addition, I calculate a measure of excess cash using only firm size and cash flow volatility (excess cash 5). I use the three models to determine excess cash on a quarterly basis which I define to be the difference between actual cash / assets and that predicted by the models.

**Table A1**  
**Determinants of Cash /Assets**

The dependent variable is the natural logarithm of cash / assets. Quarterly data is used from 1985-1994. A cross-sectional regression is run each quarter and the time series of coefficients are used to get the mean and t-statistic. Market to book is defined as (book assets - book equity + market equity)/ book assets. Real size is the natural logarithm of real assets where real assets are deflated into 1994 dollars using the CPI. Cash flow is defined as (earnings before interest and taxes + depreciation and amortization - interest - taxes - common dividends). NWC is defined as (current assets - current liabilities - cash), thus net working capital is measured net of cash. Total leverage is long term plus short term debt divided by total assets. Industry Sigma is the mean of the standard deviations of cash flow / assets over 20 quarters for firms in the same industry defined by 2 digit SIC codes. When R&D expense is listed as missing it is assigned the value of zero. Dividend dummy is a variable set to 1 if a firm paid a dividend and 0 otherwise.

Variable	Excess Cash 5	Excess Cash 2	Excess Cash 1
Real Size	-0.1318 (-48.01)	0.0067 (2.69)	-0.0054 (-1.51)
Industry Sigma	0.5240 (4.23)	0.4078 (3.53)	0.3799 (3.79)
Market to Book		0.1451 (34.36)	0.1571 (36.40)
NWC / Assets		-1.4769 (-42.54)	-1.4335 (-35.20)
Capex / Assets		-0.9231 (-8.66)	-0.8108 (-6.88)
Total leverage		-2.8929 (-114.72)	-2.5926 (-112.51)
R&D/Sales		0.4186 (8.04)	0.4766 (7.64)
Dividend Dummy		-0.3489 (-32.05)	-0.3053 (-32.69)
Cash Flow / Assets			0.5286 (3.39)
N	40	40	40
Adjusted R <sup>2</sup>	3.91%	21.25%	18.36%